CLAIMS

We claim:

1. A telecommunications interface system that automatically configures an accessory having a predetermined number of electrical accessory contacts to appropriately interface with a telephone base unit having two electrical output contacts, wherein the interface system is configured for coupling the output contacts to a predetermined pair of the accessory contacts, the interface comprising:

a. an interface port having the predetermined number of accessory contacts, wherein the port receives an input signal from the output contacts on two of the accessory contacts;

b. a signal processing circuit having two signal inputs coupled for receiving the input signal from the interface port; and

c. a directing circuit coupled between the interface port and the signal processing circuit for automatically electrically coupling the output contacts to the signal inputs.

2. The telecommunications interface system according to claim 1 wherein the base unit further comprises two electrical input contacts, wherein the interface system is configured for coupling the input contacts to a predetermined pair of the accessory contacts,

a. the signal processing circuit further comprising two signal outputs coupled for providing an output signal;

b. the interface port further comprising means for receiving the output signal from the signal outputs on two of the accessory contacts; and

c. the directing circuit further comprising means for electrically coupling the signal outputs to the input contacts.

3. The telecommunications interface system according to claim 2 wherein the signal processing circuit further comprises means for controlling the directing circuit in order to manipulate the coupling of the input and output contacts with the signal inputs and outputs.

4. The telecommunications interface system according to claim 3 wherein the interface system further comprises a decisional circuit coupled to the means for controlling the directing circuit, in order to configure the means for controlling the directing circuit.

5. The telecommunications interface system according to claim 4 wherein the signal processing circuit further comprises a differential amplifier coupled to the directing circuit for receiving the input signal from the base unit, regardless of polarity.

6. The telecommunications interface system according to claim 5 wherein the analog circuit further comprises an output automatic gain adjusting circuit coupled to the differential amplifier for providing an adjusted input signal having a predetermined range of amplitudes.

7. The telecommunications interface system according to claim 6 further comprising a reference signal, wherein the output automatic gain adjusting circuit adjusts the input signal to a predetermined reference signal level.

8. The telecommunications interface system according to claim 6 wherein the signal processing circuit further comprises means for manually controlling the output automatic gain adjusting circuit coupled between the output automatic gain adjusting circuit and the addressable latch.

9. The telecommunications interface system according to claim 7 wherein the signal processing circuit further comprises means for controlling the volume of the input signal coupled between the automatic gain adjusting circuit and the addressable latch.

10. The telecommunications interface system according to claim 9 wherein the signal processing circuit further comprises an automatic level control circuit coupled to the means for controlling the volume, for providing a dynamic output limiting system.

11. The telecommunications interface system according to claim 9 wherein the signal processing circuit further comprises an output amplifier coupled to the volume control amplifier for driving an inductive load.

12. The telecommunications interface system according to claim 11 wherein the inductive load is a headset.

13. The telecommunications interface system according to claim 11 wherein the inductive load is a handset.

14. The telecommunications interface system according to claim 9 wherein the signal processing circuit further comprises means for sampling the input signal coupled between the automatic gain adjusting circuit and the means for controlling the directing circuit.

15. The telecommunications interface system according to claim 4 wherein the signal processing circuit further comprises an output amplifier coupled to the directing circuit for providing an output signal independent of interface polarity requirements.

16. The telecommunications interface system according to claim 15 wherein the signal processing circuit further comprises an output automatic gain adjusting circuit coupled to the output amplifier for providing an adjusted output signal having a predetermined range of amplitudes.

17. The telecommunications interface system according to claim 16 wherein the signal processing circuit further comprises means for manually controlling the gain of the output signal, coupled between the output automatic gain adjusting circuit and the means for controlling the directing circuit.

18. The telecommunications interface system according to claim 16 wherein the circuit further comprises means for providing additional control of the output signal coupled between the means for controlling the directing circuit and the output amplifier.

19. The telecommunications interface system according to claim 16 wherein the signal processing circuit further comprises means for amplifying the output signal, coupled to the output automatic gain adjusting circuit.

20. The telecommunications interface system according to claim 19 wherein the analog circuit further comprises means for reducing the level of noise on the output signal coupled to the output voltage control amplifier.

21. The telecommunications interface system according to claim 20 wherein the signal processing circuit further comprises an output reference low-pass filter coupled to the means for sampling the input signal, for filtering the input reference signal used to calibrate the output signal path in the directing circuit.

22. The telecommunications interface system according to claim 21 wherein the signal processing circuit further comprises means for boosting the output signal coupled to the output voltage control amplifier, to the means for reducing the level of noise, and to the output reference low-pass filter, for boosting the output signal level.

23. The telecommunications interface system according to claim 4 wherein the signal processing circuit further comprises means for manually controlling the means for controlling the directing circuit in order to provide the user with manual control of the input and output signal gains.

24. The telecommunications interface system according to claim 6 wherein the signal processing circuit further comprises means for placing the interface system in a low power consumption state coupled to the input automatic gain adjusting circuit, for conserving the interface system's power.

25. The telecommunications interface system according to claim 24 wherein the signal processing circuit further comprises a bandgap reference circuit coupled to the means for placing the interface system in a low power consumption state, to provide a stable reference voltage that is applied to the decisional circuit.

26. The telecommunications interface system according to claim 1 wherein the accessory is a voice accessory.

27. The telecommunications interface system according to claim 1 wherein the accessory is a data accessory.

28. A CO Dialtone Learning Sequence method of learning the characteristics of any telephone with a 4-wire port interface which comprises the steps of:

a. searching for a CO dialtone;
b. detecting a CO dialtone;
c. selecting receive lines;
d. setting the receive channel sensitivity by comparison with receive level references;
e. selecting transmit lines; and
f. setting the transmit channel sensitivity by comparison with a transmit reference signal.

29. A Host Automated 800 Learning Sequence method of learning the characteristics of any telephone with a 4-wire port interface which comprises the steps of:

a. searching for a DTMF tone by a host;
b. sending a preamble to a user;
c. disabling a reference signal;
d. enabling a level detect system;
e. measuring an incoming transmit signal;
f. comparing the transmit signal against a transmit level reference;
g. sending a level confirmation signal.

30. An SIT Automated 800 Learning Sequence method of learning the characteristics of any telephone with a 4-wire port interface which comprises the steps of:

a. searching for a preamble;
b. detecting the preamble;
c. selecting receive lines;

d. setting the receive lines' channel sensitivity by comparison with receive level references;

e. selecting transmit lines; and

f. setting the transmit lines' channel sensitivity by comparison with a transmit reference signal.

31. A Manual 800 method of learning the characteristics of any telephone with a 4-wire port interface which comprises the steps of:

a. enabling a Manual 800 mode;

b. sending a preamble;

c. attenuating a transmit channel;

d. attenuating a receive channel;

e. enabling switching algorithms; and

f. disabling the Manual 800 mode.

32. A telecommunications interface system that automatically configures an accessory having a predetermined number of electrical accessory contacts to appropriately interface with a telephone base unit having two electrical output contacts and two electrical input contacts, wherein the interface system is configured for coupling the output contacts to a predetermined pair of the accessory contacts and for also coupling the input contacts to a predetermined pair of accessory contacts, the interface comprising:

a. an interface port having the predetermined number of accessory contacts, wherein the port receives an input signal from the output contacts on two of the accessory contacts;

b. an analog circuit having two signal inputs coupled for receiving the input signal from the interface port and two signal outputs coupled for sending the output signal from the signal processing circuit;

c. a crosspoint switch array coupled between the interface port and the analog circuit for automatically electrically coupling the output contacts to the signal inputs and the input contacts to the signal outputs; and

d. a controller coupled to the crosspoint switch array, for manipulating the array in order to locate the appropriate input and output lines.

33. The telecommunications interface system according to claim 32 wherein the analog circuit further comprises:

a. a 32 bit addressable latch coupled to the crosspoint switch array for manipulating the coupling of the input and output contacts with the signal inputs and outputs, the 32 bit addressable latch further coupled to the shunt select array for fine tuning of the input and output signals;

b. a receive input differential amplifier coupled to the crosspoint switch array, for amplifying the difference between the two receive lines;

c. a 1 KOhm resistor coupled between two receive lines of the input differential amplifier;

d. a receive input step attenuator coupled to the differential amplifier for providing an adjusted input signal regardless of impedance and sensitivity characteristics of the telephone base unit;

e. an input multiplexer coupled between the input step attenuator and the 32 bit addressable latch, for providing manual control of the input signal sensitivity;

f. an input voltage control amplifier coupled to the input step attenuator for providing volume control of the input signal;

g. an automatic level control circuit coupled between the input voltage control amplifier and the controller, for providing a dynamic output limiting system to protect a user from prolonged high decibel sounds;

h. an output amplifier coupled to the input voltage control amplifier for driving an inductive load;

i. a switchable dialtone filter coupled between the input step attenuator and the 32 bit addressable latch to provide a means for decisionally filtering certain signals;

j. an anti-alias filter coupled to the switchable dialtone filter;

k. a sample and hold circuit coupled between the anti-alias filter and the controller for sampling the input signal in order to determine when the appropriate input and output lines are located;

l. a sampling circuit coupled to the clock pins of the switchable dialtone filter, the anti-alias and the sample and hold circuit, for sampling a fraction of the input signal;

m. an output differential amplifier coupled to the crosspoint switch array for providing an output signal;

n. an output step attenuator having a predetermined range of values, coupled to the output differential amplifier for automatically adjusting the gain of the output signal;

o. an output multiplexer coupled between the output step attenuator and the 32 bit addressable latch for manually controlling the output step attenuator;

p. a shunt select circuit coupled in parallel with the interface port and the crosspoint switch array to provide additional control of the output signal;

q. an output voltage control amplifier coupled to the output step attenuator, for amplifying the output signal;

r. an expander circuit coupled to the output voltage control amplifier for reducing noise in the output signal by utilizing electronic noise reduction;

s. an output reference low-pass filter coupled to the anti-alias filter, for filtering the input reference signal used to calibrate the output signal path in the crosspoint switch array;

t. an output preamplifier coupled to the output voltage control amplifier, the expander circuit and the output reference low-pass filter, for boosting the output signal level before it reaches the voltage control amplifier;

u. a mode latch coupled to the 32 bit addressable latch which allows the user to manually control the input and output step attenuators;

v. a sleep and system power supply circuit coupled to the input step attenuator which monitors the input signal and places the analog circuit in a standby mode when the receive signal falls below a threshold level in order to conserve power, and also couples with a power source;

w. a bandgap filter coupled between the sleep and system power supply circuit and the controller for providing a stable reference signal to the controller.

34. The telecommunications system according to claim 33 wherein the load is inductive.

35. The telecommunications system according to claim 34 wherein the inductive load is a headset.

36. The telecommunications system according to claim 34 wherein the inductive load is a handset.

37. The telecommunications system according to claim 33 wherein the load is capacitive.

38. The telecommunications system according to claim 33 wherein the load is resistive.

39. The telecommunications system according to claim 33 wherein the accessory is a voice accessory.

40. The telecommunications system according to claim 33 wherein the accessory is a data accessory.

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